

**KRENOPSECTRA NOHEDENSIS N. SP. AND THE PUPAL EXUVIAE
OF MICROPSECTRA AUVERGNENSIS REISS (DIPTERA:
CHIRONOMIDAE) FROM THE EASTERN PYRENEES**

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A hydrobiological programme is being undertaken in the natural reserve of Nohedes, eastern French Pyrenees: ecosystem analysis and biological quality assessment are the main aims. An extensive collection of invertebrates from the upper stream of the Nohedes valley has provided two interesting Tanytarsini, one a new *Krenopsectra*, and the other, the unknown pupa of an uncommon montane *Micropsectra*. Both species have been collected in other nearby tributary streams of the Tet River.

Terminology follows that of Sæther (1980), except that the flattened setae on the pupa are referred to as taeniae (Langton & Armitage, 1995). Abbreviations used: AR antennal ratio (ratio of length of apical flagellomere divided by the combined length of the more basal flagellomeres); LR leg ratio (ratio of metatarsus length to tibial length); BR bristle ratio (ratio of longest seta of tarsal segment 1 divided by the minimum width of tarsal segment 1), and VR venarum ratio (ratio of length of Cu to length of M).

Krenopsectra nohedenensis n. sp.

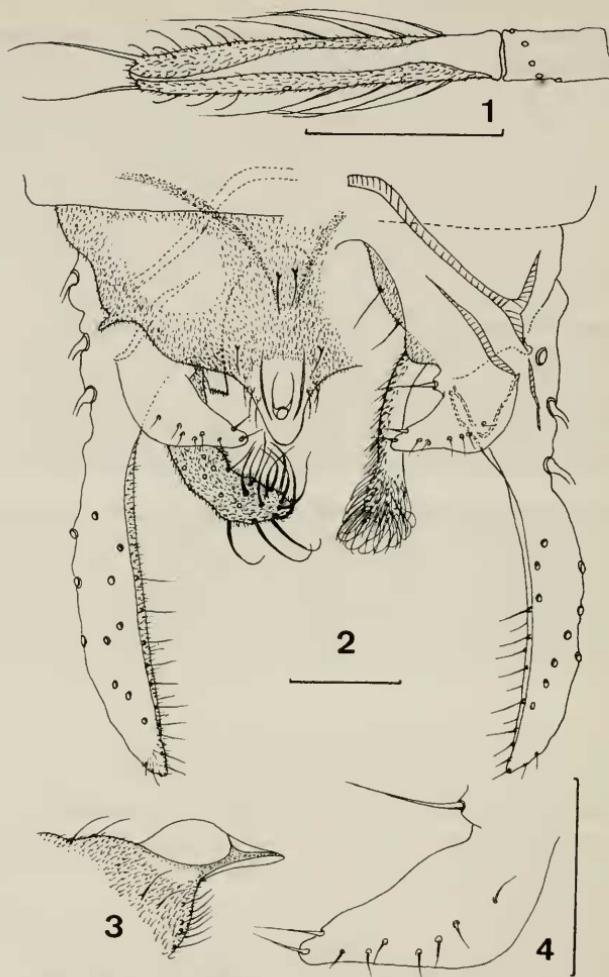
Material: Holotype 1 pharate adult male, 6.vi.1993, upper stream of Nohedes valley, eastern French Pyrenees, 1600 m asl. Paratypes 14 males, 12 pharate adult males, 6 females, 5 pharate adult females, same data as holotype. Holotype deposited in Zoologische Staatssammlung, Munich; paratypes in the authors' collection.

Adult male ($n=7$), length from anterior margin of thorax to apex of gonocoxites 3.0–3.25 mm. Yellowish, head and scutum slightly greenish, thorax brownish, abdominal segments VII and VIII darkened. Scutellum very prominent.

Head. Antenna 870–885 µm long; penultimate and ultimate flagellomeres as in Fig. 1; ultimate flagellomere 163–170 µm long, with a wide groove extending to its base, bearing at apex sensilla chaetica and 2 setae 54–59 µm long; AR 0.42–0.48. Coronal and frontal setae replaced by numerous microtrichia; inner verticals 12–14; outer verticals 2–3; postoculars 2–3. Clypeus with 16–18 setae arranged generally in 4 rows. Lengths of palp segments: 43, 46, 133, 123, 132 µm; sensilla clavata absent.

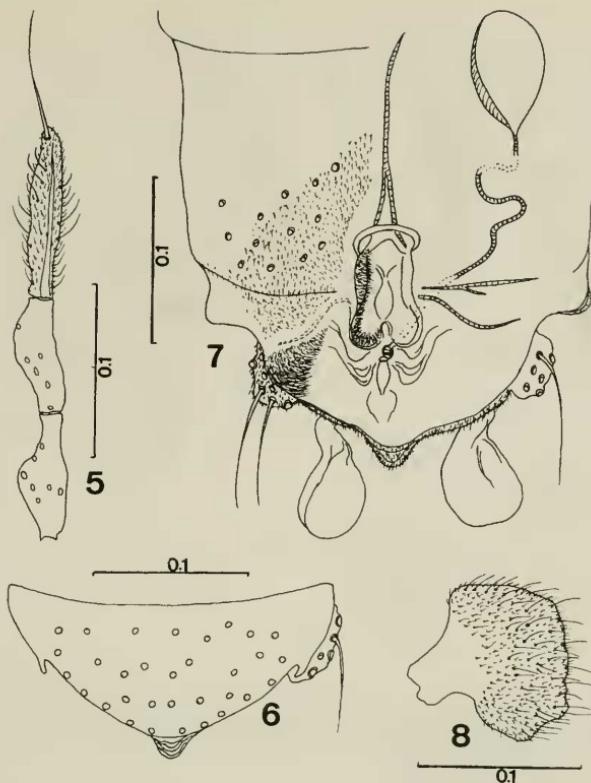
Thorax. Halteres transparent, densely covered with microtrichia and bearing 5–6 short uniserial setae. Scutellum pubescent with 8–10 setae in a single row. Antepronotals absent; acrostichals 19–20 (biserial); dorsocentrals 14–15; prealars and supraalars 0. Wing length 1.95–2.05 mm; membrane with dense macrotrichia 35–37 µm long; numerous setae on veins except M which is bare; anal lobe and squama absent; 2 sensilla campaniformia; VR = 1.30–1.32. Foreleg LR 1.34–1.38, BR 2.8–3.0.

Hypopygium as in Fig. 2. Tergite IX with 1–2 central setae and 12–16 basal setae, all subequal in size (18–22 µm long). Anal point laterally as in Fig. 3; 32–34 µm long,



Figs 1–4. *Krenopsectra nohedenensis* n.sp. male imago. 1, penultimate and ultimate flagellomeres; 2, hypopygium in dorsal view; 3, anal point in lateral view; 4, superior volsella. Scale = 0.05 mm.

31–34 µm wide at base; broad and rounded apically and reaching the apex of the superior volsella. Superior volsella (Fig. 4), with 4–6 short setae dorsally and 2, rarely 1, stout setae apically; inner basal margin with 1 very stout seta 36–40 µm long. Median volsella 93–98 µm long; slightly curved and reaching tip of inferior volsella; inner margin with fine setae increasing distally into a brush containing 6–9 inwardly directed lamellae. Inferior volsella 94–98 µm long, 17–19 µm wide; gradually curved distally. Gonocoxite with 3–4 setae laterobasally; medially slightly swollen and



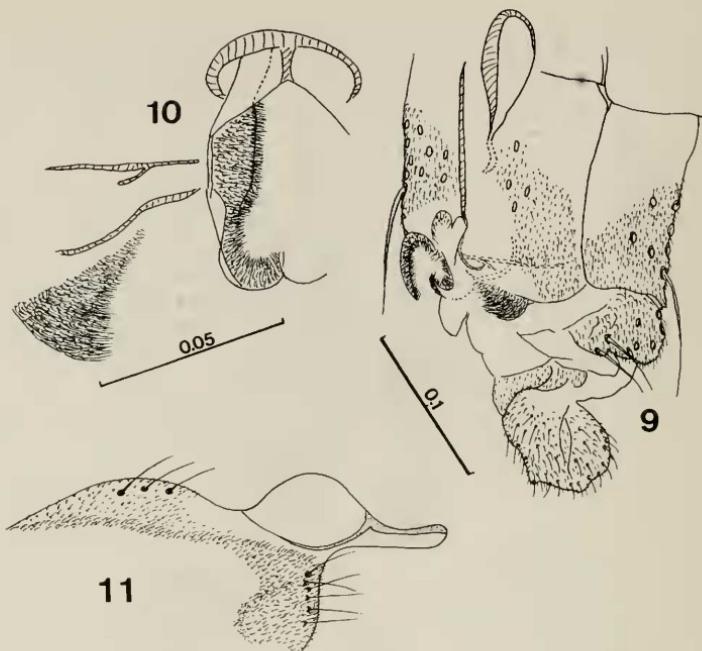
Figs 5–8. *Krenopsectra nohedensis* n.sp. female imago. 5, three last flagellomeres; 6, tergite IX in dorsal view; 7, genitalia in ventral view; 8, cercus in lateral view. Scales in mm.

bearing 2–3 (usually 2) setae on inner margin. Gonostylus 144–150 µm long; moderately narrowed toward tip; internally over apical half with 2 rows of 6–7 projecting setae. Gonocoxite 0.60–0.65 length of gonostylus. HV (ratio of body length measured as above to gonostylus length × 10) = 2.05–2.15.

Adult female ($n=5$). Length 2.9–3.1 mm. Coloration and morphology of thorax as in male.

Head. Inner verticals 14–15; outer verticals 3; postoculars 3; coronals and frontals 0. Lengths of palp segments: 45, 29, 91, 96, 120 µm; sensilla clavata 0. Antenna 348–354 µm long; AR = 0.42–0.44; last 3 flagellomeres as in Fig. 5; ultimate flagellomere 103–106 µm long, with sensilla chaetica and 1 apical seta 60–63 µm long. Clypeus with 20–21 setae arranged in general in 5 rows (7, 5, 4, 2, 2).

Thorax. Antepronotals 0; acrostichals 20–21; dorsocentrals 22–23; prealars 3; scutellars 10 in a single row. Halteres transparent, 290–310 µm long, with 5 short setae. Wing 2.15–2.25 mm long; membrane with dense macrotrichia 51–54 µm long; anal lobe and squama absent; numerous setae on veins except on M; sensilla campaniformia 2; VR = 1.30–1.32. Foreleg LR 1.23–1.28, BR 3.10–3.20.



Figs 9 & 10. *Krenopsectra nohedenensis* n.sp. female imago. 9, genitalia in lateral view; 10, lobes of gonapophysis VIII, dorsomesal and ventrolateral lobes. Scales in mm.
Fig. 11. *Micropsectra auvergnensis* Reiss male imago: anal point in lateral view.

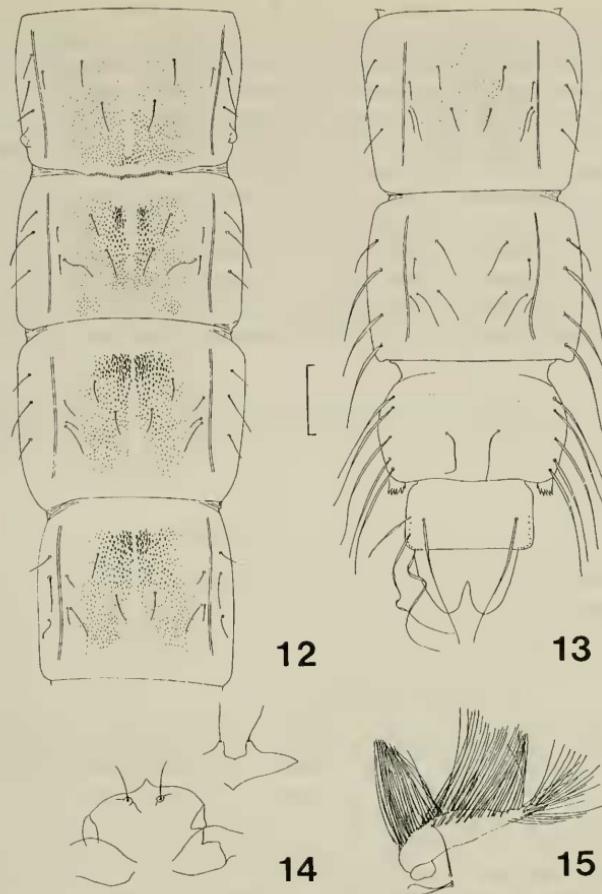
Genitalia (Figs 6, 7 & 9). Tergite IX as in Fig. 6; semicircular, undivided, and with two lateral expansions 7–9 µm long; with 31–34 setae. Gonocoxite 56–64 µm long, with 6–7 setae. Seminal capsule 73–78 µm long, 23–25 µm wide, pear-shaped. Sternite VIII (Fig. 7) with 23–28 setae. Notum 88–96 µm long; ramus 29–31 µm long; notum ratio (length of notum divided by length of ramus) = 1.35–1.7 ($m = 1.51, n = 5$). Lobes of gonapophysis VIII as in Fig. 10, clearly divided from each other; dorsomesal lobe flat ventrally, hook-like laterally; without differentiated setae at base; ventrolateral lobe densely covered with short setae which are longer towards the median margin. Cercus in lateral view as in Fig. 8; 53–60 µm long, 70–73 µm wide.

Pupa

Material: 26 pupal exuviae, 6.vi.93, a stream in upper Nohedes valley, 1600 m asl (J.M.); 1 pupal exuviae, 12.viii.94, Carança Torrent, 940 m asl, Prépyrénées (P.H.L.).

Total length 3.6–4.1 mm ($m = 3.89$ mm, $n = 27$). Cephalothorax smudged brown, wingsheaths margined with brown; abdomen colourless with segments II and VIII lightly browned, lateral apodemes golden and anterior median stronger points of IV and V highlighted with golden brown; comb brown; IX golden brown.

Cephalothorax. Frontal setae 141–240 µm long ($m = 194.5$, $n = 17$). Frontal apotome with incipient granulation. Cephalic tubercles (Fig. 14) broad-based



Figs 12–15. *Krenopsectra nohedenensis* n.sp. male pupa. 12, dorsal view of segments II–V; 13, dorsal view of segments VI–IX; 14, appearance of cephalic tubercles on flattened and folded frontal apotome; 15, thoracic horn and precorneal setae. Scale = 0.1 mm.

elongate cones 64–130 µm high ($m = 77.1, n = 11$). Thoracic horn (Fig. 15) set at right angles to basal bulb, 384–576 µm long ($m = 474.9, n = 24$), 3.3–7.0 times as long as broad ($m = 4.9, n = 21$), with a broad band of long setae about 7 setae wide from base to apex, towards apex the band widening to encompass the horn, longest setae 304–450 µm long ($m = 406.1, n = 24$), 0.7–1.2 times horn length ($m = 0.83, n = 24$). Nose of wingsheaths small; pearl row absent. All setae of cephalothorax hair-like, not flattened. Lengths of lateral anterpronotal setae 70–173 µm (104.4, $n = 16$), median anterpronotal setae 141–225 µm ($m = 196.5, n = 15$), precorneal setae 1–3 186–272; 150–208; 112–160 µm ($m = 222.9; 184.9; 149.9, n = 15$), dorsocentral setae 1–4 93–154; 77–173; 102–163; 96–141 µm ($m = 128; 114.3; 138.8; 123.7, n = 20$), occasionally forked.

Abdomen (Figs 12, 13). Segment I unarmed. Tergite II nearly covered with small points that are a little larger posteriorly; the posterior median longitudinal smooth space only weakly closed anteriorly, the lateral bands diverging to produce a V-shaped median bare patch; hook row 0.31–0.44 segment breadth, of 73–96 hooks ($n=10$); pedes spurii B well developed. Tergite III similar to II but lateral point patches rectangular with a narrow bare longitudinal band medially; antero-median points larger and somewhat darkened. Tergites IV and V as III but antero-median larger points more extensive. Tergite VI as V but points sparser laterally and no differentiated points anteriorly. Tergite VII with or without a pair of small antero-median point patches. Tergite VIII with antero-lateral corners armed with very small points. Comb of segment VIII with 4–7 elongate marginal teeth. Sternites, paratergites and parasternites unarmed. Tergite IX unarmed; anal lobes truncate behind, 0.87–1.19 as long as broad, fringe starting about half-way back. Chaetotaxy: (S = taeniae)

	I	II	III	IV	V	VI	VII	VIII	IX
dorsal	2	2	5	5	5	5	5	1	1S
lateral	0	3	3	3	3	3			
lateral S							4(3)	4	8–13
ventral	2	3	4	4	4	4	4	1	

Larva unknown.

Taxonomic remarks

Two species of *Krenopsectra* Reiss have been described previously: *acuta* (Goetghebuer, 1934) and *fallax* Reiss (1969b, 1974). Only *fallax* hitherto has been recorded from rivers in the Alps and Pyrenees (Reiss, 1969b; Serra-Tosio & Laville, 1991). The adult male of *nohiedensis* can be separated from the other two species by the combination of the following characters: anal point uniformly broadened; superior volsella large, not so narrowed towards the tip as in both *acuta* and *fallax*; median volsella bearing 6–9 broad lamellae at tip; basal inner margin of gonocoxite swollen medially.

Key to adult male *Krenopsectra*

- 1 Anal point broadly rounded and swollen medially, with nipple-like apex. *K. acuta* (Goetghebuer)
- Anal point uniformly broadened to base, not swollen medially 2
- 2 Superior volsella gradually narrowed to tip. Median volsella with less than 10 apical lamellate setae *K. nohiedensis* n.sp.
- Superior volsella strongly contracted before tip, the apical part nearly parallel-sided. Median volsella with more than 12 apical lamellate setae *K. fallax* Reiss

The adult female of *nohiedensis* is characterized especially by its low notum ratio, the shape of tergite IX (undivided and bearing lateral expansions), the morphology of gonopophysis VIII and particularly by the flattened dorsomesal lobe.

The pupal exuviae of *nohedensis* run to *Krenopsectra fallax* at couplet 125 of the key to Tanytarsini in Langton (1991). The pupa of *acuta* has also been described (Reiss, 1969b) and was overlooked in the construction of the West Palaearctic key. The three species may be incorporated as follows:

- 125 Fringe of anal lobes restricted to the posterior half of the lobes, of 15 taeniae or fewer 125a
- Fringe of anal lobes complete, usually of many more taeniae 126
- 125a Thoracic horn extending from the basal bulb, not strongly bent at base
Krenopsectra acuta Reiss
- Thoracic horn bent at right angles at attachment to basal bulb. 125b
- 125b Tergites III-V, apart from the smooth median longitudinal band, nearly covered with points. Only one dorsal taenia on the anal lobes
Krenopsectra nohedensis sp. nov.
- Tergites III-V with the point patches on either side of the smooth midline truncated triangular, narrow anteriorly and spreading towards the lateral margin of the tergite posteriad. Krenopsectra fallax Reiss

Micropsectra auvergnensis Reiss

When *M. auvergnensis* was described by Reiss (1969a) from the Massif Central, the pupa was unknown. A partly eclosed adult male establishes as *auvergnensis* a new pupal form from a stream in the upper Nohedes valley, type locality of *Krenopsectra nohedensis*, and a stream a few kilometres to the west. The lateral view of the male anal point (Fig. 11) was not figured in the original description.

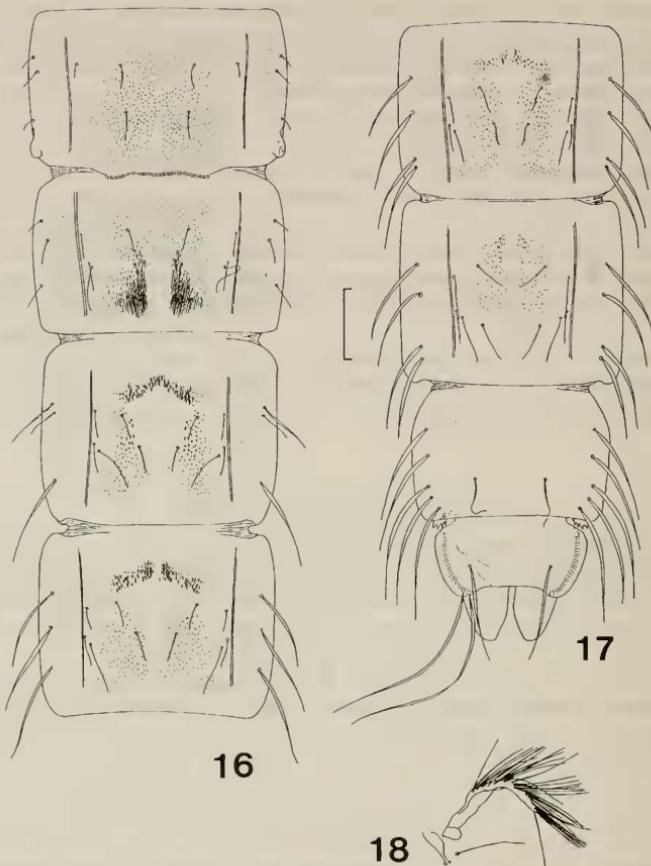
Material: 1 partly eclosed adult male and two damaged pupal exuviae, 6.vi.93, stream in upper Nohedes valley, 1600 m asl (J.M.); 1 pupal exuviae, 31.v.94 Aude stream, 950 m asl, Prépyrénées (P.H.L.).

Description of pupa

Total length 3.7, 4.2 mm. Colourless to faint golden brown anteriorly and posteriorly, in addition golden brown smudging of cephalothorax and of tergites where the stronger armament is situated; comb golden-brown.

Cephalothorax. Frontal setae 220–240 µm long. Cephalic tubercles very weak. Antennal sheath base with weak rounded-conical projection. Thoracic horn (Fig. 18) 304–384 µm long, 38–54 µm broad, 5.6–10 times as long as broad; longest horn setae 208–230 µm long, 0.68–0.71 times as long as horn. Nose of wingsheaths small; pearl row absent. All setae of cephalothorax hair-like, not flattened. Lengths of lateral antepronotal setae 90–130 µm, median antepronotal setae 150–170 µm, precorneal setae 1–3 166–192; 90–128; 90–109 µm, dorsocentral setae 1–4 80; 64; 96; 77 µm. Posterior thoracic mound moderately swollen.

Abdomen (Figs 16 & 17). Segment I unarmed. Tergite II almost covered with points; hook row 0.38–0.45 breadth of segment II, of 72–88 hooks. Tergite III with the point patch deeply emarginate postero-medially, the points on each side of the emargination replaced by spines 51–64 µm long. Tergites IV and V with an anterior pair of slightly oblique bands of strong points, narrowly separated medially, from the lateral ends of which extends a point band which widens posteriad. Tergites VI and VII similar to tergites IV and V but the anterior bands progressively weaker, hardly recognizable on VII; VII also with the lateral bands ceasing at about level seta D5.



Figs 16-18. *Micropsectra auvergnensis* Reiss male pupa. 16, dorsal view of segments II-V; 17, dorsal view of segments VI-IX; 18, thoracic horn and precorneal setae. Scale = 0.1 mm.

Tergite VIII with a small patch of minute points antero-laterally. Sternites unarmed. Paratergites II-VII armed with small points. Comb of segment VIII with 4 or 5 marginal teeth. Anal lobes rounded, 1.1-1.2 times as long as broad. Pedes spurii B of segment II conspicuous. Chaetotaxy (S=taeniae):

	I	II	III	IV	V	VI	VII	VIII	IX
dorsal	2	3	5	5	5	5	5	1	IS
lateral	0	3	3	1					
lateral S				2	3	4	4	5	29-34
ventral	0	2	3	4	4	4	4	1	

Taxonomic remarks

The pupa of *M. auvergnensis* founders at couplet 126 of the key to Tanytarsini in Langton (1991). It has in common with other members of the *attenuata* group the armed paratergites (inaccurately referred to as 'pleura' in the key); however, the conspicuous anterior point patches of tergites IV and V would direct the user to a point later in the key. *M. auvergnensis* may be included in the key as follows:

- 126 Tergites IV and V nearly covered with strong points, the points of the anterior transverse point patches similar in size but more dense than elsewhere on these segments and may be rendered conspicuous by a golden or brown colouring of the cuticle around them. (Paratergites of mid abdominal segments extensively armed with small points.) 127
- If tergites IV and V with extensive armament, then the points of the anterior point patches much stronger than those behind 127a
- 127 (unchanged)
- 127a Paratergites II–VII armed with small points *Micropsectra auvergnensis* Reiss
- Paratergites II–VII unarmed, or rarely with a restricted area of small points 128

Ecology

Reiss (1969a) for species of the *Micropsectra attenuata* group states 'Although larvae are not available, the rearing and collecting conditions of adults give rise to the impression that the larvae are cold stenothermic, oxybiontic inhabitants of lenitic [sic] areas in springs and upper stream courses'. The fast-flowing montane streams that have yielded both *Krenopsectra nohedenensis* and *Micropsectra auvergnensis* in the Pyrenees, fall within this general classification. Their larval habitats within the streams are being investigated.

M. auvergnensis has been previously recorded for the Auvergne in France and Westfalen in Germany (Reiss, 1969a). It is unlikely that *K. nohedenensis* is restricted to the eastern Pyrenees.

ACKNOWLEDGEMENTS

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SHORT COMMUNICATION

The occurrence of seaweed flies (Diptera: Coelopidae) on the Isle of Islay.—The two British species of seaweed fly, *Coelopa frigida* (F.) and *C. pilipes* Hal., breed on beds of decomposing wrack formed by seaweed deposited on the shore during high tides or during storms. An early map describing the distribution of the genus in Britain was concerned primarily with mainland shores and therefore largely ignored the islands lying off the west coast of Scotland (Dobson, 1974). A more recent map (Phillips *et al.*, 1995; primarily from data collected by T. H. Day at the University of Nottingham), concerning the wider European distribution of the genus, does signify the presence of *C. frigida* on Uist in the Outer Hebrides but gives no information for any of the other Hebridean islands. To augment the knowledge of the distribution of the genus in this area, I recently (5.xi.95 to 8.xi.95) sampled four sites on the Isle of Islay in the Inner Hebrides. The sites covered the extreme east and west of the island and the shores along Loch Indaal in the centre of the island. To sample, I disturbed wrack material on the shore and gathered any flies which emerged by ‘aspirating’ using a portable car vacuum cleaner (Black & Decker Ltd, Spennymoor, Co. Durham). Each sample consisted of the flies collected in a 15-minute period. The flies collected are summarized below.

Machair Bay (NR207630)—*C. frigida*; males 8, females 17. *C. pilipes*; 0.

Bowmore (NR310600)—*C. frigida*; males 24, females 44. *C. pilipes*; 0.

Black Rock (NR305630)—*C. frigida*; 0. *C. pilipes*; 0.

Port Askaig (NR432693)—*C. frigida*; 0. *C. pilipes*; 0.

Although there is some inconsistency, the results confirm the occurrence of *Coelopa frigida* on Islay and provide no evidence of the presence of *C. pilipes*. This data supports Phillips *et al.* (1995) who suggested that *C. pilipes* is relatively scarce in the north-west of the British Isles, possibly reaching the edge of its geographic range.

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